

PARENTAL SMOKING AND CHILDRENS' LUNG FUNCTION

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## LUNG FUNCTION IN CHILDREN

The studies that have investigated lung function in children and its possible relationship to environmental tobacco smoke exposure are presented in this section. To aid in the interpretation of this literature, definitions of the major lung function parameters are provided below.

Df: One of the most widely used measures of pulmonary function in adults and children is **forced vital capacity** and is represented in the literature as **FVC**. This term refers to the maximum volume of gas that a person can expire as forcefully and rapidly as possible from their lungs immediately following a maximal inspiration of air. When a person's ability to expire air forcefully and rapidly from their lungs (FVC) is compromised, this can possibly be an indication of chronic obstructive lung disease. Decreased FVC is common in restrictive diseases such as pulmonary fibrosis and in obstructive diseases such as emphysema and asthma.

Df: A second important measure of pulmonary function is the **forced expiratory volume in one second**, which is abbreviated as **FEV1** in the literature. The FEV1 measure is simply the amount of air that is expired in the first second of the FVC maneuver. As with FVC, this parameter is useful in the assessment of airway obstruction. The two parameters, FVC and FEV1, are often used in a ratio to determine the percentage of a person's FVC that is expired in the first second of the maneuver. A FEV1/FVC ratio lower than 65% to 70% is characteristic of obstructive lung disease. On the other hand, subjects with restrictive lung disease will often show a normal or exaggerated FEV1/FVC value.

Df: **Forced expiratory flow**, known as **FEF25%-75%**, is the average rate of flow of air during the middle half of an FEV1 maneuver. The FEF25%-75% is indicative of the status of the medium and small sized airways. Decreased values of FEF25%-75% are common in the early stages of obstructive lung disease. Low values of FEF25%-75% in combination with normal values of FVC and FEV1 are often indicative of early small airways abnormality. Reduced FEF25%-75% are sometimes seen in cases of severe restrictive disease as well.

All of these measures share a common problem: accurate assessment requires the full cooperation and maximal effort of the subjects under investigation. Accurate measures are sometimes

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therefore difficult to obtain, especially when the subjects are young children who do not fully comprehend the requirements being made of them in the pulmonary function tests. The studies are not consistent in the lung function parameters they measure, and there is also a lack of consistency among the results of the same function tests across studies. Following is a presentation of the major studies that have examined these lung function parameters in children. The investigators who have found associations between impaired lung function and ETS exposure are often uncertain of the clinical meanings of the small decreases observed in their studies. Therefore, it is not suprising that no definitive conclusions have been reached regarding ETS exposure and its possible association with lung function in children.

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#### REFERENCE

Ruppel, Gregg. Manual of pulmonary function testing (Fourth edition). The C.V. Mosby Company, 1986, pp. 33-38.

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## RESULTS OF SELECTED STUDIES: CHILDHOOD LUNG FUNCTION

STUDY	EFFECT ON FEV1, FEV.75	EFFECT ON FEF25-75%
Tager 1976	decrease	not reported
Tager 1979	none	decrease
Weiss 1980	none	decrease
Tager 1983	decrease 7%	none
O'Connor 1987	decrease 5-7%	decrease 14-15%
Ware 1984	decrease .6-.9%	not reported
Berkey 1986	decrease .85%	not reported
Hasselblad 1981	decrease .5-2%	not reported
Tashkin 1984	none	decrease 2.5%
Ekwo 1983	none	none
Vedal 1984	none	decrease 4%
Spinaci 1985	decrease	none
Chen 1986	decrease 3%	decrease 6%
Burchfiel 1986	decrease 4-5%	not reported
Yarnell 1979	decrease 3%	decrease 12%
Teculesco 1986	decrease 5%	not reported
Tsimoyianis 1987	not done	decrease
Lebowitz 1987	none	not done
Leeder 1976	not done	not done
Schilling 1977	none	not reported
Speizer 1980	none	not reported
Dodge 1982	none	not reported
Lebowitz 1984	none	not reported
Lebowitz 1984	not done	not done

Adapted from Witorsch 1989

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